

TENAYA CREEK BRIDGE

Yosemite National Park Roads and Bridges
Spanning Tenaya Creek on Mirror Lake Road
Yosemite National Park
Mariposa County
California

HAER NO. CA-98

HAER
CAL
22-YOSEM,
19-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

U.S. Department of the Interior

P.O. Box 37127

Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

TENAYA CREEK BRIDGE
Yosemite National Park
HAER No. CA-98

HAER
CAL
22-YOSEM,
19-

I. INTRODUCTION

Location:

Tenaya Creek Bridge carries the Mirror Lake Road across Tenaya Creek in the east end of Yosemite Valley, Yosemite National Park, Mariposa County, California.

QUAD: El Capitan, CA
UTMs: 11/274700/4180075

Date of Construction:

1927-1928

Designer and Builder:

Designed by George D. Whittle, Senior Highway Engineer for the San Francisco district office of the Bureau of Public Roads.

Contractors: Rocca and Caletti

Original and Present Owner

Yosemite National Park, National Park Service.

Present Use:

Park road bridge.

Significance:

Like other road bridges in Yosemite Valley, the Tenaya Creek Bridge exemplifies the National Park Service "rustic style" of architecture through its use of a stone veneer to conceal its reinforced concrete construction.

Project Information:

This document was prepared as part of the Yosemite Roads and Bridges Recording Project, undertaken by the Historic American Engineering Record in summer 1991.

Richard H. Quin, Historian, 1991

II. HISTORY

This is one in a series of reports prepared for the Yosemite National Park Roads and Bridges Recording Project. HAER No. CA-117, YOSEMITE NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads.

HISTORY OF TENAYA CREEK BRIDGE

The Tenaya Creek Bridge* carries a limited-access road to Mirror Lake, one of the attractions in the northeast end of Yosemite Valley. The lake, formed by rockfalls from both walls of the creek's lower canyon damming Tenaya Creek, was long famed for picturesque reflections of the granite monolith Mt. Watkins and other promontories on the side of the rugged Tenaya Creek Canyon.

A trail was constructed to Mirror Lake in the late 1860s under the auspices of the Board of Commissioners of the Yosemite Grant. The trail apparently ran between the north bank of Tenaya Creek and the north rim of the Valley, alleviating the need for a bridge. The Board of Commissioners considered constructing a substantial bridge across the creek as early as 1867. The Commissioners hoped to improve access from the embryonic Yosemite Village to Mirror Lake, which was already drawing the attention of early Yosemite tourists.¹ Fortunately, the Commissioners did not build the bridge in 1867, as a flood just before Christmas wrecked all the other bridges in Yosemite Valley.

A toll road was constructed from the Valley to Mirror Lake in 1875 by W. J. Howard, who established a rustic hotel at Mirror Lake. But visitors protested having to pay a toll to see the natural attraction, and in 1879 the Board of Commissioners purchased the road and freed it from tolls.² Howard may have provided the first bridge across the creek.

A bridge definitely existed at this site by 1886, as Yosemite promoter James Mason Hutchings that year wrote of a "strong bridge" carrying "Tis-sa-ack Avenue Road" across "Ten-ie-ya Creek" at this spot.³ (Ten-ie-ya, or Tenaya, for whom the creek was named, was chief of the Yosemite band of Indians at the time of contact in 1851.) The wooden span was 85' long.⁴ The road was routed from the "Morraine Bridge" (now Clark's Bridge) across the Merced River at James Lamon's orchard northeast to Mirror Lake, requiring the new bridge across the creek.

Lawrence V. Degnan, a civil engineer raised in Yosemite Valley, recalled that the Tenaya Creek Bridge, like other bridges in the Valley, had its wooden deck removed each fall to protect the structure against destruction from heavy snow loads. The boards were replaced after the snows had cleared.⁵

In 1912, acting park superintendent Major William W. Forsyth reported that the bridge was in poor condition and in need of replacement.⁶ Its replacement was speedily approved, and a new structure was erected in 1913 at a total cost of \$278. The new wagon bridge was 50' long and 12' wide.⁷

Automobiles were reintroduced into Yosemite National Park that year after having been banned in 1907, and the new \$278 bridge soon proved inadequate for the increased loads. The first National Park Service Superintendent for Yosemite, Washington B. Lewis, called for replacement of the structure and the

* Identified as "Tenaya Bridge" in the Yosemite National Park "List of Classified Structures."

other Valley bridges in first annual report, filed in 1916.⁸ However, no appropriation was immediately forthcoming.

Following a landmark 1925 agreement with the Bureau of Public Roads (BPR), the National Park Service turned over the responsibility for the design of major park roads and road structures to the Bureau, an agency of the U.S. Department of Agriculture. Between 1927 and 1929, the BPR undertook the replacement of six Yosemite Valley bridges with stone-faced masonry structures. These were designed by the BPR's San Francisco district office, which also supervised their construction. The bridges were modern reinforced concrete structures, but were faced with native granite so as to appear somewhat indigenous to the landscape. These arch bridges were constructed by first erecting a stone vault, into which the concrete was poured. The bridges were then faced in cut stone and filled with earth before paving. The use of native materials made the bridges textbook examples of the new "rustic style." Six new bridges were constructed in this manner, including a replacement for the Tenaya Creek span.

Like the other stone-faced bridges, the new Tenaya Creek Bridge was designed by George D. Whittle, Senior Highway Engineer for the BPR's San Francisco office, with design assistance from National Park Service Landscape Engineering Division. The designs were reviewed by a panel from the National Commission of Fine Arts, and by the engineering division of the National Park Service. The San Francisco construction firm Rocca and Caletti was awarded the construction contract.⁹

Excavation for the bridge abutments began in November 1927. The timber falsework was erected next, and by the end of March 1928, the arch centering for the span was completed and most of the voussoirs or arch ring stones were placed. Steel reinforcing bars were then laid to support the concrete vault and the back walls. In April, the arch ring was complete and the concrete arch was poured in several stages. The arch centering was then removed and the stone-faced spandrel walls were completed. By late May, the forms for the concrete back walls were in place. The pouring was done in June, and by the end of July the bridge was complete except for the placement of fill around abutments and the laying of curb stones. Final work on the parapet walls was done in August, and in September the bridge was accepted by the Park Service. The old (1913) Tenaya Creek Bridge was removed as the concluding part of the project in July and August 1928.¹⁰

Over the course of the bridge work in the Valley, the construction firm of Rocca and Caletti showed little interest in protecting the landscape values at their construction sites. Acting park superintendent E. P. Leavitt criticized the company for failing to adhere to the park's standards when the company cut trees without permission, quarried sand and stone from unauthorized sites, and used excessive amounts of dynamite, causing irreparable scarring. Park officials "pleaded, scolded and threatened in an effort to control, but without result," and Leavitt was forced to order the contractors arrested on charges of desecrating park property. This proved effective, and the bridges were completed in a satisfactory manner.¹¹

In 1970, The National Park Service banned cars from the eastern third of the Yosemite Valley, and propane-powered shuttle buses were placed in service. This encouraged visitors to leave their cars. As part of the road closure, the Mirror Lake Road was closed to all traffic.¹² Today, the road remains off-limits to motorized vehicles, and the Tenaya Creek Bridge is primarily used by cyclists and walkers.

The Tenaya Creek Bridge is 95' long and 42' wide; this allows for two 13' 6" roadways, a 5' sidewalk and a 7' bridle path. The bridge spans Tenaya Creek

on a semi-elliptical arch 56' 9" wide, rising 9' 7" from the springing line. The arch is constructed on a 25° skew. The reinforced concrete abutments rest on deep wooden piles. The bridge is of stone-faced reinforced concrete construction. Native granite was employed for the arch ring stones or voussoirs, for the parapet walls, and for the facing of the spandrel and wing walls. Class "A" concrete was used for the arch ring, and Class "B" concrete for substructure work.* The concrete was supported by a grid of steel reinforcing bars (1" diameter rods on 11" centers, and 1 1/8" diameter transverse rods on 22" centers in the barrel arch; 1 1/4" diameter rods in the abutments). The concrete was sealed with a waterproofing membrane treatment before the earth fill was added. The roadway is covered with a bituminous asphalt surfacing, and is set apart from the asphalt sidewalks/bridle paths by stone curbs.¹³

* Classes of concrete refer to the amount of Portland cement used in the mixture, with Class "A" having the highest proportion and so on.

III. ENDNOTES

1. Linda Wedel Greene, *Yosemite, The Park and Its Resources: A History of the Discovery, Management, and Physical Development of Yosemite National Park, California*, 3 vols. (Washington, D.C.: National Park Service, 1987), I:67, 80.
2. "Letter from Mirror Lake," *Mariposa Gazette*, 12 June 1875, 2; Shirley Sargent, Galen Clark: *Yosemite Guardian*, (San Francisco, CA: Sierra Club Books, 1964), 129.
3. James M. Hutchings, *In the Heart of the Sierras, the Yo Semite Valley, Both Historical and Descriptive, and Scenes by the Way; the Big Tree Groves, the High Sierra, with its Magnificent Scenery, Ancient and Modern Glaciers, and Other Points of Interest, with Tables of Distances and Altitudes, Maps, Etc., Profusely Illustrated*. (Oakland, CA: Pacific Press Publishing House, 1886; reprint ed., Lafayette, CA: Great West Books, 1990), 391.
4. A. R. Ehrnbeck, Lt., U.S. Army Corps of Engineers, "Report of the Park Engineer" in William W. Forsyth, Major, Sixth Cavalry, *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1909 (Washington, D.C.: Government Printing Office, 1909), App. A, 17.
5. Laurence V. Degnan to Douglass H. Hubbard, Yosemite National Park Ranger/Naturalist, 8 January 1957. Yosemite Research Library.
6. William W. Forsyth, Major, Sixth Cavalry, "Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior, 1912" (Washington, D.C.: Government Printing Office, 1912), 8.
7. [Gabriel Sovulewski], "Park Supervisor's Report," 15 October 1913, in *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1913. (Washington, D.C.: Government Printing Office, 1913), 24.
8. Washington B. Lewis, "Report of the Superintendent of Yosemite National Park" in *Reports of the Department of the Interior*, 1916. 2 vols. (Washington, D.C.: Government Printing Office, 1917), I:790.
9. Robert C. Pavlik, "In Harmony with the Landscape: A History of the Built Environment of the Yosemite National Park" (Master's Thesis, University of California at Santa Barbara, 1986), 47-48; Nathan W. Morgan, Office Engineer, National Park Service, Mesa Verde National Park, to Bert H. Burrell, Acting Chief Civil Engineer, National Park Service, Portland, Oregon, 4 October 1925, National Archives, Record Group 79, Entry 22, Box 18, Mesa Verde file.

10. E. P. Leavitt, Acting Superintendent's Monthly Report, November 1927; Acting Superintendent's Monthly Report, March 1928, 5; Acting Superintendent's Monthly Report, April 1928, 4; E. C. Solinsky, Acting Superintendent's Monthly Report, May 1928, 6; Leavitt, Acting Superintendent's Monthly Report, June 1928, 3; Acting Superintendent's Monthly Report, July 1928, 4; Acting Superintendent's Monthly Report, August 1928, 3; Acting Superintendent's Monthly Report, September 1928, 3; Acting Superintendent's Monthly Report, July 1928, 4; Acting Superintendent's Monthly Report, August 1928, 3.

11. Pavlik, 48-49.

12. George B. Hartzog, Jr., "Clearing the Roads--and the Air in Yosemite Valley," *National Parks & Conservation Magazine*, August 1972, 17.

13. Construction information taken in part from U.S. Department of Agriculture, Bureau of Public Roads, "Yosemite National Park, Plans for Five Bridges, Details of Construction," construction drawing, December 1927, and "Yosemite National Park, Plans for Five Bridges, Tenaya Creek Bridge," construction drawing, November 1927. Field measurements checked by HAER, July 1991.

IV. BIBLIOGRAPHY

PRIMARY SOURCES

PUBLIC DOCUMENTS

These documents include reports printed by the Government Printing Office which originated in the Executive Branch and in the Congress, as well as reports and other documents originating in other government agencies, but not published by the Government Printing Office (such as park records).

PUBLISHED PUBLIC DOCUMENTS

Ehrnbeck, A. R., Lt., U.S. Army Corps of Engineers. "Report of the Park Engineer," in William W. Forsyth, Major, Sixth Cavalry, *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1909. Washington, D.C.: Government Printing Office, 1909.

Forsyth, William W., Major, Sixth Cavalry. *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1909. Washington, D.C.: Government Printing Office, 1909.

Greene, Linda Wedel. *Yosemite, The Park and Its Resources: A History of the Discovery, Management, and Physical Development of Yosemite National Park, California*. 3 vols. Washington, D.C.: National Park Service, 1987.

Lewis, Washington B. "Report of the Superintendent of Yosemite National Park" in *Reports of the Department of the Interior*, 1916. 2 vols. Washington, D.C.: Government Printing Office, 1917.

Sovulewski, Gabriel. "Park Supervisor's Report," 15 October 1913, in *Report of the Acting Superintendent of the Yosemite National Park to the Secretary of the Interior*, 1913. Washington, D.C.: Government Printing Office, 1913.

UNPUBLISHED PUBLIC DOCUMENTS

Leavitt, E. P. Acting Superintendent's Monthly Report, November 1927.

--Acting Superintendent's Monthly Report, March 1928.

--Acting Superintendent's Monthly Report, April 1928.

--Acting Superintendent's Monthly Report, June 1928.

--Acting Superintendent's Monthly Report, July 1928.

--Acting Superintendent's Monthly Report, August 1928.

--Acting Superintendent's Monthly Report, September 1928.

Solinsky, E. C. Acting Superintendent's Monthly Report, May 1928.

CONSTRUCTION DRAWINGS

United States Department of Agriculture, Bureau of Public Roads. "Yosemite National Park, Plans for Five Bridges, Details of Construction." Construction drawing, December 1927.

--"Yosemite National Park, Plans for Five Bridges, Tenaya Creek Bridge." Construction drawing, November 1927.

OTHER PRIMARY SOURCE DOCUMENTS

Degnan, Laurence V., to Douglass H. Hubbard, Yosemite National Park Ranger Naturalist, 8 January 1957. Yosemite Research Library.

Hartzog, George B., Jr. "Clearing the Roads--and the Air in Yosemite Valley." *National Parks & Conservation Magazine*, August 1972.

Hutchings, James M. *In the Heart of the Sierras, the Yosemite Valley, Both Historical and Descriptive, and Scenes by the Way; the Big Tree Groves, the High Sierra, with its Magnificent Scenery, Ancient and Modern Glaciers, and Other Points of Interest, with Tables of Distances and Altitudes, Maps, Etc., Profusely Illustrated.* Oakland, CA: Pacific Press Publishing House, 1886; reprint ed., Lafayette, CA: Great West Books, 1990.

"Letter from Mirror Lake." *Mariposa Gazette*, 12 June 1875, 2.

Washington, D.C., National Archives. Nathan W. Morgan, Office Engineer, National Park Service, Mesa Verde National Park, to Bert H. Burrell, Acting Chief Civil Engineer, National Park Service, Portland, Oregon, 4 October 1925. Record Group 79, Entry 22, Box 18, Mesa Verde file.

SECONDARY SOURCES

Pavlik, Robert C. "In Harmony with the Landscape: A History of the Built Environment of the United States." (Master's Thesis, University of California at Santa Barbara, 1986).

Sargent, Shirley. *Galen Clark: Yosemite Guardian.* San Francisco, CA: Sierra Club Books, 1964.